UNIVERSIDAD TECNOLOGICA INDOAMERICA.

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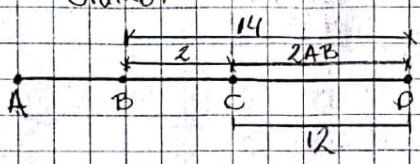
Carrera: 2 Industrial
Fecha: 16-10-2017.

MATERIA: Geometria Plana y Trigonometria.

SEGMENTOS

12- Si en el gráfica: $CD=2AB$, $BD=14$ y $BC=2$. Encontrar el valor de AC.

Gráfico:



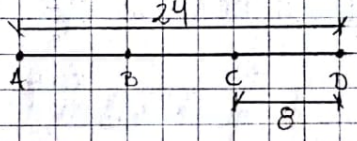
H: $CD=2AB$
$BD=14$
$BC=2$
T: $AC=?$

Desarrollo
$2AB=12$
$AB=6$
$AC=AB+BC$
$AC=6+2$
$AC=8$ //

$\boxed{AC=8}$

13.- Dado los puntos colineales A, B, C y D. Si $AD=24$, $CD=8$ y $\frac{AB}{BC}=\frac{AD}{CD}$, calcular BC.

Gráfico



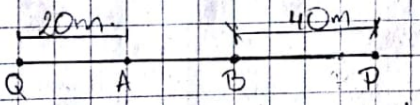
H: $AD=24$
$CD=8$
$\frac{AB}{BC}=\frac{AD}{CD}$
T: $BC=?$

Desarrollo.
$\frac{AB}{BC}=\frac{AD}{CD}=\frac{24}{8}=\frac{3}{1}$
$AB=3BC$
$AD-BC-CD=3BC$
$AD-CD=4BC$
$24-8=4BC$.
$16=4BC$
$BC=4$ //

$\boxed{BC=4}$

14.- Dados los puntos colineales concecutivos Q, A, B y P tales que: QB y AP estan en la razón 4/5, $QA=20m$ y $BP=40m$. Encontrar AB.

Gráfico



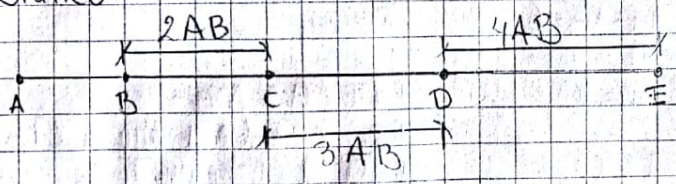
H: $\frac{QB}{AP}=\frac{4}{5}$
$QA=20m$
$BP=40m$
T: $AB=?$

Desarrollo
$\frac{QB}{AP}=\frac{4}{5} \Rightarrow 5QB=4AP$
$5(QA+AB)=4(AB+BP)$
$5QA+5AB=4AB+4BP$
$AB=4BP-5QA$
$AB=(4.40m)-(5.20m)$
$AB=60m$ //

$\boxed{AB=60m}$

15.-

Gráfico



H: $AB=\frac{BC}{2}=\frac{CD}{3}=\frac{DE}{4}$
$DE-CD=4$
T: $BC=?$
Desarrollo

$AB=\frac{DE}{4}$
$4AB=DE$
$4AB=4+CD$
$4AB=4+3AB$
$AB=4$
$2AB=BC$.
$BC=8$ //

$\boxed{BC=8}$

Edinacho

Lineazul

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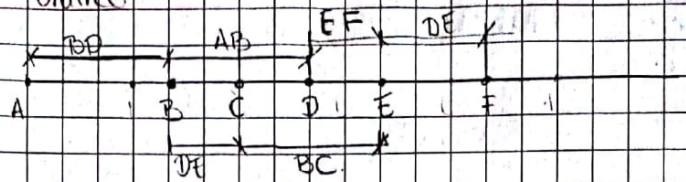
16. Dados los puntos colineales A, B, C, D, E y F, si AB = BD, BC = CE, DE = EF y BD − EF = 6. Calcular CD.

Gráfico



H: AB = BD
BC = CE
DE = EF
BD − EF = 6

T: CD = ?

Desarrollo

CD = AF − AB − BC − DE − EF

BD − EF = 6
BD = 6 + EF

BC + CD = 6 + DE
CE + CD = 6 + DE
CD + DE + CD = 6 + DE
2CD = 6
CD = 3 //

CD = 3 //

17. Dados los puntos colineales A, B, C, D y E. Si BC = 3AB, $\frac{CD}{BC} = \frac{1}{3}$ y $\frac{AC}{CE} = \frac{4}{9}$. Encontrar $\frac{DE}{BC}$

Desarrollo:

H: BC = 3AB
$\frac{CD}{BC} = \frac{1}{3}$
$\frac{AC}{CE} = \frac{4}{9}$

T: $\frac{DE}{BC} = ?$

BC = 3CD
AB = CD

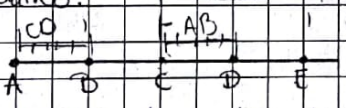
$\Rightarrow 9AC = 4CE$
$9(AB + BC) = 4(CD + DE)$
$9AB + 9BC = 4CD + 4DE$
$5AB + 9BC = 4CD$
$BC + 2AB + 6BC = 4CD$
$2AB + 10BC = 4CD$
$AB + 5BC = 2CD$

$\frac{BC}{3} + 5BC = 2CD$

$BC + 15BC = 6CD$
$16BC = 6CD$
$\frac{CD}{BC} = \frac{8}{3}$

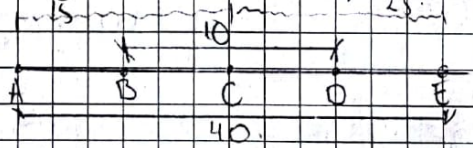
$\frac{CD}{BC} = \frac{8}{3}$

Gráfico.



18. Dados los puntos colineales A, B, C, D y E. Si $\frac{BD}{CE} = \frac{2}{5}$, DE − AB = 6, AE = 40 y BD = 10. Calcular CD.

Gráfico



H: $\frac{BD}{CE} = \frac{2}{5}$
DE − AB = 6
AE = 40
BD = 10

T: CD = ?

$\frac{BD}{CE} = \frac{2}{5}$

$CE = \frac{10 \cdot 5}{2}$

CE = 25

Desarrollo:

DE = AE − AB − BC
DE = AE + 6 + DE − BC
2DE = AE + 6 − BC
2DE = 40 + 6 − 10
2DE = 36
DE = 18

CE = CD + DE
CD = CE − DE
CD = 25 − 18

CD = 7 //

CD = 7 //

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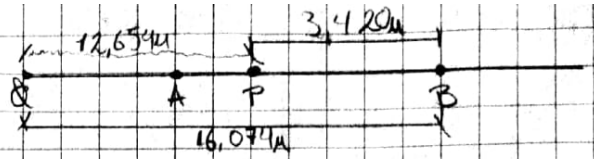
19: H: $\frac{AP}{PB} = \frac{AQ}{QB}$

$PB = 3,420u$
$BQ = 16,074u$
T: $AP = ?$

Gráfico



Desarrollo

$16,074\,AP = 3,420\,AQ$
$16,074\,AP = 3,420\,(QP - AP)$
$16,074\,AP = 3,420\,QP - 3,420\,AP$
$19,494\,AP = 3,420 \cdot 12,654$
$19,494\,AP = 43,277$
$AP = 2,220u$ //

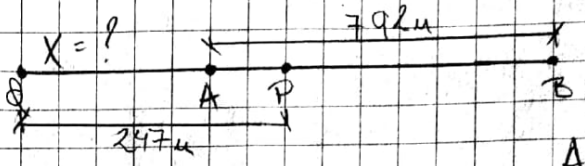
$\boxed{AP = 2,220u}$

20:

H: $\frac{AP}{PB} = \frac{AQ}{QB}$

$AB = 792u$
$PQ = 247u$
T: $AQ = ?$

Gráfico



$AQ = X$

Desarrollo

$AP = QP - QA$
$QB = QP + AB - AP$
$PB = AB - AP$

$\frac{AP}{PB} = \frac{AQ}{QB}$

$X = \frac{AP \cdot QB}{PB}$

$x = \frac{(QP - x)\cdot(AB + x)}{AB - AP}$

$x = \frac{(247 - x)(792 + x)}{792 - QP + x}$

$x = \frac{195624 - 792x + 247x - x^2}{792 - 247 + x}$

$x = \frac{195624 - 545x - x^2}{545 + x}$

$x^2 + 545x = 195624 - 545x - x^2$

$2x^2 + 1090x - 195624 = 0$

$x^2 + 545x - 97812 = 0$

$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-545 + \sqrt{545^2 - 4(1)(-97812)}}{2.(1)}$

$x = 142,33u$ //

$AQ = 142,33u$ //

$\boxed{AQ = 142,33u}$

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21. H: $\frac{AP}{PB} = \frac{AQ}{QB}$

$PB \times BQ = 28u$

$BQ - PB = 7u$

T: $AB = ?$

Desarrollo

$PB = \frac{28u}{BQ}$

$PB = BQ - 7u$

$\frac{28u}{BQ} = BQ - 7u$

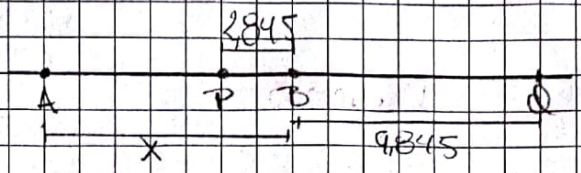
$28u = BQ^2 - 7BQ$

$BQ^2 - 7BQ - 28 = 0$

$BQ = \frac{b \pm \sqrt{b^2 - 4ac}}{2a}$

$BQ = \frac{7 \pm \sqrt{7^2 - 4(1)(-28)}}{2(1)}$

Gráfico



$AB = X$

$BQ = 9,845$

$PB = BQ - 7$

$PB = 9,845 - 7$

$PB = 2,845$

$\Rightarrow \frac{AP}{PB} = \frac{AQ}{QB}$

$\Rightarrow \frac{x - PB}{PB} = \frac{x + BQ}{QB}$

$\Rightarrow \frac{x - 2,845}{2,845} = \frac{x + 9,845}{9,845}$

$\Rightarrow 9,845x - 28 = 2,845x + 28$

$7x = 56$

$x = 8u$

$\boxed{AB = 8u}$

22. H: $\frac{AP}{PB} = \frac{AQ}{QB}$

$AQ - BP = 25u$

$AQ - AB = 10u$

T: $AB = ?$

Desarrollo.

$BQ = AQ - AB = 10$

$AP = (AQ - PB) - BQ$

$AP = 25 - 10$

$AP = 15u$

$\Rightarrow PB = \frac{QB \cdot AP}{AQ}$

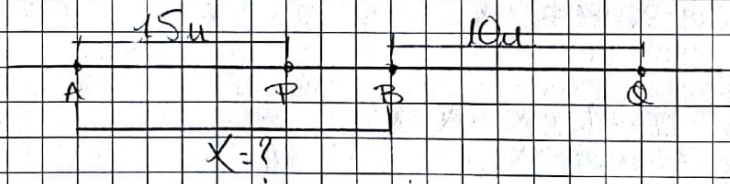
$PB = \frac{10 \cdot 15}{AQ}$

$PB = \frac{150}{x+10}$

$(x - AP)(x + 10) = 150$

$x^2 + 15x + 10x - 150 = 150$

Gráfico



$x = AB$

$\Rightarrow x = AP + PB$

$x = AP + AQ - 25$

$x = 15 + AQ - 25$

$x = AQ - 10$

$x^2 - 5x - 300 = 0$

$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{5 + \sqrt{5^2 + 4(1)(300)}}{2a}$

$x = 20u$

$\boxed{AB = 20u}$

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23- H: $\frac{AP}{PB} = \frac{AQ}{QB}$

$QP = 10\mu$
$AQ = 15\mu$

T: $AB = ?$

Desarrollo

$AP = AQ - PQ$
$AP = 15 - 10$
$AP = 5$

$\frac{AP}{PB} = \frac{AQ}{QB}$

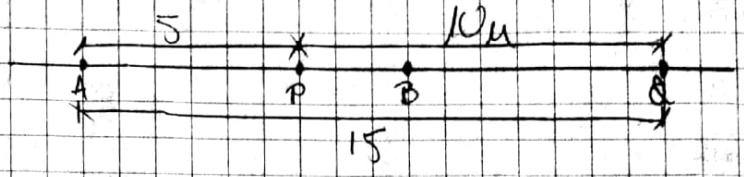
$\frac{AP}{AB-AP} = \frac{AQ}{AQ-AB}$

$AP(AQ-AB) = AQ(AB-AP)$

$(5.15) - 5AB = 15AB - (15.5)$

$75 - 5AB = 15AB - 75$

Gráfico



$-5AB - 15AB = -75 + 75$

$-20AB = -150$

$(-AB = -7,5) \times -1$

$\boxed{AB = 7,5\mu}$

24- H: $AP \times BQ = PB \times AQ$
$AP = PQ = 20\mu$

T: $PB = ?$

Desarrollo

$AP * BQ = PB * AQ$

$AP \times BQ = PB \times (AP + PQ)$

$AP(PQ - PB) = 40PB$

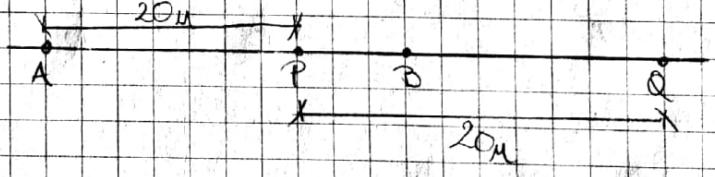
$400 - 20PB = 40PB$

$(-20-40)PB = -400$

$-60PB = -400$

$PB = 6,66\mu$

Gráfico



$\boxed{PB = 6,66\mu}$

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25: H: $AP \times BQ = PB \times AQ$
$AP = BQ = 8u$

T: $PB = ?$

Desarrollo

$PB = X.$

$AP \cdot BQ = PB \cdot AQ$

$8 \cdot 8 = x \cdot (8 + x + 8)$

$64 = 8x + x^2 + 8x$

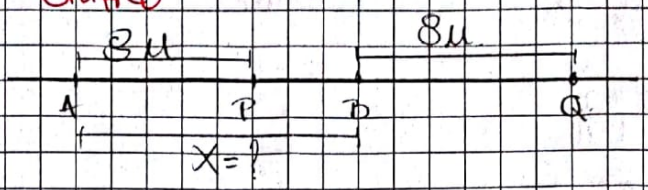
$x^2 + 16x - 64 = 0$

$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-16 + \sqrt{16^2 - 4(1)(-64)}}{2a.}$

$X = 3,3u$

Gráfico



$PB = 3,3u$

26. H: $AP \times BQ = PB \times AQ$
$AQ = AB = 15u$

T: $PB = ?$

Desarrollo

$AP \cdot BQ = PB \cdot AQ.$

$(AB - X)\,30 = x \cdot 15$

$(15 - x)\,30 = 15x$

$450 - 30x = 15x$

$(-45x = -450)(-1)$

$x = 10u$

Gráfico

$PB = 10$

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